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ART. I.—*Memoir on the Climate, Soil, Produce, and Husbandry of Afghanistan and the neighbouring Countries.*—By Lieut. IRWIN.<sup>1</sup>

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PART II.—OF SOIL.

90. It may appear an easy task to learn the nature of the soil in the various districts, or at least the more ostensible properties, such as colour and consistency, but in practice many disappointments will be experienced. Informants are apt to impose upon the inquirer their own petty experience, for the general truth of things; on few subjects is local vanity found so strong a vitiating testimony. Moreover, let the testimony be ever so candid, the circumstances of the case present some other difficulties. It is well known that within short distances the nature of the soil is often found to vary in all degrees. Evidence as to a small part of the district is here but little conclusive with respect to the whole, and it requires a large induction of particulars (which may not always be procurable) to establish an accurate generalization; and the terms used are often vague and of difficult interpretation. However strange, it is yet true, that the ideas of the Asiatics on colour are very different from ours, and their arrangement and nomenclature are calculated to mislead an inexperienced inquirer. From all these causes the following observations must be received, as they are offered, with distrust.

<sup>1</sup> Continued from p. 804

91. The immediate environs of Delhi are of a sandy soil, though not a mere sand, and generally of a yellow colour. In the northern road to Lodhiana after a few stages the soil becomes more and more loamy and black. The soil of Paneeput is a fine sandy loam. At Umbala, which lies on the left of the Kughur, the soil is a deep loam or mud, of a dark brown colour and great strength. Kughur and Sursootee running in a muddy soil are narrow and deep, and hence a slight fall of rain makes them impassable. The Markunda, which the traveller crosses between Shadeepoor and Lundee, before he reaches the Sursootee, ultimately falls into that stream; it runs in sand, and is shallow and broad. At Sirhind and as far as Lodhiana the soil has a greater proportion of sand than on the banks of the Kughur. The soil of the country of Bhutner is various. The cultivated parts are loam or sandy loam; some of the pastures contain tracts of sand hills, and others of level hard clay. Under the great northern hills the soil has a great proportion of mud, of a rich quality and much natural moisture. In the road between Delhi and Lodhiana, water in wells is found at moderate depths, but to the left hand, in Hureeana and Bhutner, we come to places where the wells are of considerable depth.

92. In the Dooab or country lying between the Sutluj and Beah, we find the soil to possess considerable variety, but on the whole it may be described as a sandy loam of excellent quality, very little elevated above the surface of the rivers, and the wells are consequently shallow. The Beah runs in sand, and sweeps away in its waters sand of a yellow colour; the Sutluj in the rainy season is more turbid and muddy. The right bank of the Beah is high and sandy, and there seems to be a gradual descent thence to the Ravee. The soil of this part of the upper Punjab has a great proportion of sand, but yet has sufficient firmness. The remaining two Dooabs have a less proportion of sand, yet little loam is to be seen. In some places tracts occur which are naturally sterile. In the upper Punjab, the greatest cultivation, though perhaps not the greatest population, is in places near the great range of hills which bound it to the north-east, the soil there having less sand and being of superior quality. On the whole strangers have too high an opinion both of the natural advantages and of the population of this province. Its water is much boasted of, and that of the rivers may deserve praise, but that of the wells is seldom good.

93. In this respect it is much excelled by the Dooab of the Hydaspes and Indus, in which the water is peculiarly good. I must be understood as speaking of that in or near the Embassy's route from

Attock on the Indus, to Julalpoor on the Hydaspes; it has been already mentioned that some parts of the country to the left, or north-east of that route, are noted for Goitres, a disease occasioned by bad water, (see paragraph 89.) The soil in the greater part of this Dooab but especially Pothwar, is a light yellow sand, which the rains cut into deep ravines in the most irregular and curious manner; every year the existing plain grounds are thus destroyed and new ones formed. Sometimes beneath the sand are seen strata of loose rounded stones, or of silt, stone, and sand, and these layers are sometimes of great thickness. Water in wells is near the surface, but the farmers are not at the expense of digging wells for irrigating their Rubbee crop, putting trust in the winter and spring rains, and the natural goodness of their land. Huzara and Pukhlee have good soils of various kinds, but yet inferior to Chhuchh; they have however greater command of water for irrigation. The soil of Kushmeer is generally loam, and in colour black or dark brown. The district of Pamper, in which alone saffron is produced, is a red clayey loam. The soil of Kushmeer and the nearest hills around it, is remarkably free from stones. The Hydaspes when low, is sea-green and turbid, its waters on reaching the Punjab are of a deep coffee colour. Its alluvial matter is loam, that of the Indus sand.

94. We return to Delhi to detail the nature of the soil in the Embassy's route thence to Peshawur. It becomes more and more sandy from Delhi to Rewaree and Kanour. The wells are of considerable depth, and the water often brackish. The country of the Shekhawuts, which next succeeds, is superior in all these respects, and the fields have occasionally a few stones in them derived from the low hills which traverse this tract. Leaving it we enter a sandy plain, generally abounding with sand hills. The depth of the wells increases at every stage till we reach Beekaneer, where it amounts to 264 feet. The water is sometimes good and sometimes brackish in various degrees. That of Nathoosur is peculiarly bad. Beyond Beekaneer the desert is commonly considered as beginning. To twelve miles beyond Poogul, or sixty-seven miles from Beekaneer, the same soil continues; but the sand hills are higher than before. Next commences a level hard smooth clay; this is locally called *Chitrang*, and it is only in such tracts that the traveller imagines he sees lakes and rivers before him. To the western edge of the desert is eighty-three miles more, and about half of this distance is clay, the other half sand, which appears to have been nearly blown over the clay. From Beekaneer the depth of the wells gradually decreases. The soil of the desert, generally considered, is not inferior

to that of Beekaneer, and where the sand and the clay are mixed in due proportions, is of an excellent quality. It is therefore neither the badness of the soil, nor the depth of the wells, as commonly imagined, that causes the desert to be so thinly peopled, neither is its water worse than that of the tracts to the eastward. There are several reasons to think it was in former times better inhabited. It is unquestionably for the interest of the British Government, that it should be utterly uninhabited and impassable; a little address and a moderate expense could effect this object even with a due regard to the rights of the present inhabitants.

95. The edge of the desert at Buhawulpoor is only three miles from the left bank of the Ghara, and the space between them from the north-west point of Sadik Khan's dominions to where the Ghara is lost in the Chunab (see paragraph 32) is seldom much more than double this distance. This narrow tract is of a soil not to be surpassed in fertility. When dry its surface has a degree of whitishness perhaps originating from a mixture of chalk; when watered it appears black. It is deep and friable, and may be called a clayey loam or mud. The Ghara when low has a whitish colour, and its water is very good. Its bed abounds in quicksands, having that mixture of fine sand and mud which seems calculated to form them. The rivers in general of the Punjab as well as the Indus have quicksands. Beyond the Ghara, on the road to Mooltan, is a tract of sandy ground, in which the wells are deeper and some of the plants and other appearances of the great desert occur, from which in fact it seems to have been cut off by the Ghara. It extends at most but two or three days to right and left of the road travelled by the Embassy; and gradually melts into the more fertile country which surrounds it. It seems to rest on clay, and the soil of Mooltan has a great proportion of clay; many of the fields give evidence of salt, and in general the soil is inferior to that of Buhawulpoor.

96. In the further progress of the Embassy from Mooltan to the commencement of the hills beyond the Indus at Punecala, the basis of the country appears still to have been clay, though in some cases the uppermost stratum be sand. At three and a half miles from the left bank of the Chunab begins the Thul of Mohummud Khan already mentioned (see paragraph 29;) it is sand of a poor quality, but not uncultivable. It is broadest to the north, and there too the wells are deepest. In this quarter is situated Munkeera, the chief fort of Mohummud Khan, which is thought to be secure less by the strength of its own works, than the barrenness of its neighbourhood, and the scarcity and badness of the water. In the route of the Embassy the wells were

of moderate depth, but the water sometimes brackish. Towards the Indus the quality of the soil and water improves, but the country is still sandy. Mukulwad, on the other hand, beyond the Indus, is a stiff and hard clay of an ashy colour; in process of time it may assume a different character. On the one hand the Indus is continually encroaching on it, and washing it away. Where that river has mixed its sand with the original clay, the quality of the soil is plainly improved. On the other hand, towards the Daman and the hills, are considerable tracts of sand incumbent on the clay, and impregnated with salt; the rains annually bring down more sand and spread it on the clay. The original soil on the right of the Indus, even as far as Shikarpoor appears to have been clay, and clay is even now predominant; but towards the river a portion of sand has been introduced from its waters; and towards the hills sand or stones, or both, have been washed down by the rains. South-west of Dera Ghazee Khan, which is the capital of upper Sindh (see paragraph 25) on the road to Seeweestan, are the sands of Dajul, which if extensive would constitute a desert. Largee, (see paragraph 14) is sandy and unproductive. The plain of Eesa Khel is a clay or clayey loam of the best quality; it is of a dark red colour; its breadth is inconsiderable, and the Indus is daily diminishing it. The same changes in short are here operating as in Mukulwad, for here also we find a tract of barren and saline sands under the hills. The water of the Koorm after rain is of a bright red colour, and it deposits a loam of good quality. The district of Bunnoo is sandy, or a sandy loam. In the country of the Murwuts, which lies to the right of that river, and south-east of Bunnoo, are some tracts of sands very similar to those already mentioned; such also occur between Bunnoo and the districts of Malgeen and Kohat. These districts however have as yet received but little injury, from their neighbourhood possessing an excellent soil, which may be called a clayey loam. The colour in Kohat is black or grey, but in Malgeen red.

97. The original soil, and that which still predominates in the plains of Peshawur and Bajour is a clayey loam; there are now however several exceptions deserving of notice. Opposite to Chhuchh is the plain of the Mundeers, or lower Yoosufzyes, the soil of which is of the same kind and quality with that of Chhuchh. On the other side of the Cabul river the Khutuks possess the south-eastern corner of the plain of Peshawur, which is light, often stony, and of indifferent quality; more to the west, but still under the hills, are Oormul and some other places in which the soil is sandy and naturally poor. The Mihmund's lands are generally a clayey loam; and the Khuleel's

have a still greater proportion of clay. The colour of the soil is various; it requires much water and much stirring, but when properly treated bears heavier crops than most lands in our provinces. Bajour is of a like nature. The lands of the Mihmudzyes and Daoodzyes have had introduced into them by alluvion a considerable proportion of sand. The latter are thirsty, and bear but ordinary crops. Swad and Punjkora has each its river, and are less clayey than Bajour. The Gugecanee lands are clayey, but such as are near the Ootman Khel and upper Mehmund hills have a mixture of stone. The Khuleels have the firmest soil, the clay extending to a great depth, and water being at a considerable distance from the surface: hence this tribe have dug many underground dwellings, in which to take refuge during the heat of midsummer, and they are not subject to fall in like those made in other parts of the plain.

98. Teera has a stony soil, which generally contains a considerable proportion of sand. Koonur and Lughman are loams of good quality, and very well watered, and productive in rice. The former because of its wideness requires a greater quantity of water for irrigation than Bajour. Jellalabad is a sandy and thirsty soil. Under its hills (the range of  $34^{\circ}$ ) there extends on the left hand of the traveller to Cabul a barren tract, in length about forty-five miles from Busawul to Nimla; and in average breadth about five or six. It is partly stony and partly sandy. Perpetual winds here prevailing, it is thought that these sands are encroaching on the good lands. The present soil of Jellalabad has probably been transported from them by the winds. The lands of the upper Mihmunds are of very various kinds. Kama is clayey and moist, Goshta is inclined to sandy.

99. We find considerable variety in the soil of Cabul. The greater part is a loam with a great proportion of clay, but stones, gravel, and sand, have been lodged under the hills by the rains. On the left hand of the traveller as he goes to Ghorbund from Cabul, is a sandy tract under the hills. It is about eleven miles long by four broad, and quite uncultivated. This is the Reg-ruwan of which many fabulous stories are told by Aboolfuzl and others. The gardens and grounds used for raising vegetables in the vicinity of Cabul, have, by long care and culture been cleared of stones, and now have a black, fertile vegetable soil, from nine to twelve inches deep. In general the lands in this valley bear heavier crops of all things proper for the climate than those of the plain of Peshawur; but this is partly attributable to the plentiful manure and assiduous culture they receive. Draw-wells are but little used, as water is near to the surface; but the water of draw-

wells in the city of Cabul is acknowledged to be bad. The neighbourhood of Ghuznee has a light soil, with a mixture of small stones. Some other parts of the table land are stiffer, as having more clay in their composition. A mixture of stones in the cultivated fields is universal, and indeed considerable tracts of the table land are so covered with small stones, as to yield but little, even in pasturage. The north has a good deal of broken ground; the south is more level. With respect to the lands of the Huzaras, they are of no one kind except that they are generally stony.

100. Mookr and Abitazee, on the road from Ghuznee to Candahar, have light soils with a mixture of small stones. The Dooranee country generally considered must be pronounced sandy. Near Candahar the soil is sandy and thirsty, but facilities exist for irrigation. In the city of Candahar water in draw-wells is near the surface, and of good quality, and few places can be named in the whole of Khoorasan where the water is bad. In general the inhabitants drink from running streams, but draw-wells are not unknown, especially within cities and in the desert places frequented only by shepherds. Between Hirat and the Persian Khoorasan there is a sterile tract, which forms an imperfect barrier. The Regimulikan would be crossed in the direct road from Jellalabad, the capital of Seestan, to Furah, and is of considerable extent. South of Soorbut the traveller crosses a desert tract forty miles broad, on the road to Goonabad and Ghaeen. In Seestan, especially the west, there are considerable expanses of sand, generally without fixed inhabitants, and sometimes without water. Between Jellalabad and Kilat of the Beeloches, the country is supposed to be generally a desert. The various desert or sterile spaces now mentioned, appear to me to have an imperfect communication with one another, and therefore do not constitute a military barrier; nay, we perhaps over-rate the difficulties they would throw in the way of the disposition and passage of troops. By digging draw-wells an enterprising and ingenious enemy would find water at a less depth in the earth than is commonly imagined.

101. Zumindawur is situated, as already mentioned, on the right of the Helbund, (see paragraph 56.) Its soil is more loamy than that of most other parts of the Dooranee country, and is of a good quality. North-west of it is the country called Seahbund, situated within the Paraparnisan mountains, and inhabited by the Tymunus, a tribe of Ymaks: part of it has a clayey soil. The Gurmseer lies south and south-west of Zumindawur. Its soil, which is naturally sandy and weak, is rendered productive by water drawn from the Helbund. The Joolgha

or plain of Hirat is a sandy loam naturally fertile, and being well watered bears good crops. The same species of soil extends to Murv, and beyond it, although the intermediate space be little cultivated. The soil of Murv is esteemed very good ; that of the Jumsheedee tribe, whose territory forms the north-east corner of Khoorasan (see para. 19, 27,) is perhaps equally good, and the Ymak vallies are in general fertile. In the Jumsheedee country, and also in Jam and Toorbut, is a great deal of broken ground. There is a less proportion of this in the country of Ghaeen, and Birjund, and in Zumindawur, but still it is considerable. Ekatool, belonging to the Ulukhoo-Zyes, a tribe of Dooranees, is remarkable for the quantity of its ravines and broken ground. Sungoo a city of Khaf has a hard clayey soil. The soil of Mushhud is good and productive. To the north we soon reach the desert of Margiana, which is generally a sandy plain, but contains some low hills or hillocks. To the east it approaches near to Muno, and north of that place joins the sands lying between Bactria and the Oxus (see paragraph 104.)

102. The great desert called Loot, lies south and west of Seestan, and divides Seestan and Khoorasan from the Persian province of Kirman. It undoubtedly communicates with deserts in the west of Bulochishtan, or those deserts form a part of it. It is throughout a sand, probably quite uncultivable, and the edges only are visited by the pasturing tribes. It is crossed by caravans, and sometimes by small parties of marauding horse, but in these quarters those who go on expeditions, generally mount themselves on camels, as being more patient of thirst. Like other deserts its outlines are not easily traced, as it gradually melts into the inhabited country. In the road to Tubus (the westernmost of that name) in Khoorasan, the last inhabited place in the province of Kirman is Durbund, which is forty *fursukhs* from the city of Kirman—at Durbund are some brackish springs ; thence are forty-five *fursukhs* of desert, to Chihlpaya, where are no inhabitants, but a tank containing rain water, and a bowree dug by the order of Nadir Shah. It is reckoned to be 300 feet deep, and the water is brackish. There is here a hill which appears as if overturned by some convulsion of nature ; it has not the least vegetation, and there is little grass or even shrub in this dismal desert. After fifteen *fursukhs* more, we reach Naeebund, where is some good water from springs in hills, and a few resident inhabitants. The country is still sandy and continues so far, several stages towards Tubus, and the population is but small. There is a road east of this road from Nil (see para. 27) to Khubees, where the chief inhabitants are Ghiljees, who settled



there during the time that the Afghan dynasty ruled Persia. This is even a less practicable road than the other, and in summer is not travelled. There are eight stages of a camel journeying almost incessantly, and no water is to be had in the whole space. This desert then may be pronounced impassable by regular troops, except in the smallest bodies.

103. Our knowledge is very scanty concerning Bulochistan. Its western parts or western boundaries are generally desert, but in some places villages are interspersed. There is a winding road from Kilat to Kirman through Punjgoor, Jalk, Dezuk, and Bempoor, but various parts of the stages are desolate; the soil even in the route I conceive to be generally sandy; the fertile spots are at the foot of hills, which yield them either by nature or by means of art, a scanty supply of water. The hilly tract on which is situated Kilat is much superior to the preceding, yet even here are several upland wastes in which even water is not to be had for one or two days' journey. The soil of Kilat seems to be generally loamy, but in some places is a stiff clay. Such feeble streams as the Buloch hills yield being soon absorbed in this warm climate, there intervenes a dry space between the hills and the sea-coast, which may be compared to the Tehama of Hejaz and Yemen. In this space Rind tribes wander, whose chief riches are their camels. The soil seems to be most commonly inclined to clay. In Sewestan, a clay or clayey loam seems to predominate, but Dajul (which perhaps belongs to Sindh) is sandy, and there are other exceptions. In Sewestan water in draw-wells is deeper under the surface than in Sindh, but yet at no inconvenient distance. In some routes spaces occur, of perhaps forty miles broad, where neither water nor cultivation is to be seen, but there is little reason to think the circumstance owing to the badness of the soil; some were formerly well peopled. There is a tradition that the river Indus taking a bold turn to the right formerly ran through this country, and appearances are said to favor it. The lake or swamp called Manchoor, mentioned by Aboolfuzl, was perhaps a part of the bed of the Indus; it is thought to be in the south-east. Aboolfuzl tells us it is near Seewee, but this I conceive erroneous. There are some low and moist lands in Sewestan, which perhaps were also parts of the Indus bed. There is reason to think that from other causes the rest of Bulochistan (and the remark might be extended to other countries) is drier and more barren than in former times.

104. The soil of Bactria from Mymuna to Talikan, has a great proportion of clay in its original composition; at present this is most

visible in those parts which are neither near to the hills nor the Oxus ; for towards the former, the matter brought down by the rains has often changed the soil to stony, gritty, or gravelly, sometimes to sandy ; towards the Oxus the soil becomes a loose unfertile sand. The sands begin at Huzrut Iman, and continue to the lake of Aral, their breadth continually increasing. In the space intercepted between Huzrut Iman and the common road from Bulkh to Bokhara, through Kilif, the average breadth of these sands, which are nearly waste, is more than thirty miles ; the sandy tract opposite, on the right of the river, is not so broad. The soil of Bulk is a clayey loam, sufficiently friable, and of a good quality. That of Koonduz is very similar, and in colour black. Khoollum, and generally that under the hills is a hard gravelly clay. Talikan is a loam inclining to clay, of a good quality. Undkho has a good deal of sand, but Mymuna is a strong clay, and abounds in ravines and broken ground. About half way between Undkho and Mymuna the traveller begins to see numerous hillocks in the plain, and they continue as far as Muro, and almost to Hirat. They are composed of a good soil, without stone, and bear good grass ; they are sometimes under crop, but the chief cultivation in this space is near the moist banks of streams constant or temporary. Budukhshan has a stony soil, but otherwise it is very various in consistency, colour, and excellence. Fyzabad is a sandy loam of a reddish colour, as is found in many other places. Durwaz, and the Shooghnan and Wukhan vallies have a blackish soil. The same observations are probably as applicable to Wukeeha and Keerategin as to Budukhshan.

105. The west of Toorkistan is sandy, and without artificial watering yields poor crops ; hence the chief cultivation is near the banks of rivers and streams. Between Kilat and Bokhara the water of wells is usually brackish, but is found at moderate depths. The hillocks near this road are of sand, not of a good soil as those of Bactria. To the west of Bokhara is the Kurakol, an uncultivated space which extends to the lake of Aral ; but it is not considered as crossing to the left of the Oxus, where begins the great desert of Margiana, so called by the ancients. The principality of Khwaruzm is thus encircled by deserts. It is however to be remarked, that the Toorkmuns who live on the edge of the river, generally avail themselves of the facilities it affords for irrigation in its flood season, and raise some crops on the low grounds near it. Water is here so near the surface, that the inhabitants often dig wells, where they pitch their tents, to serve for their use during the time they may halt. In the interior of the deserts there are wells, which have

been dug by the governments of former times; these are never remarkably deep in the Kurakol, but the water is at least as good as that of draw-wells in the neighbourhood of Bokhara. The soil too is seldom impregnated with salt, and were it the custom of the country to water lands from wells, it could be brought into cultivation. At present it affords an early grass to be pastured in the spring. That part which is next to Bokhara, was formerly cultivated. The Kurakol extends beyond the Jaxartes into the country of the Kuzzaks, but that people have also hills and declivities with a good soil. With respect to the Kirghiz country, and the east of Toorkistan, the soil has considerable variety; many places are stony; loam and clay are very common, and in natural fertility the cultivated lands of the east are unquestionably superior to those of the west. The Pamer has a rich soil.

106. In the vast extent of Chinese Toorkistan it may be supposed there is to be found all varieties of soil. That of Yarkund is sandy and weak, and sandy wastes intervene between it and Khootun, in which the Chinese Government have erected pillars to guide the travellers into the right road. The uncultivated space is about an hundred miles broad, if we pursue the ordinary road. The soil of Khootun is superior to that of Yarkund, and the cultivation considerable. The river of Yarkund passes through this country. To the north-east sands soon recommence, in which the river is at length lost, at no great distance from Toorfan. Ela and Aksoo lie near to mountains in northerly directions, are tolerably well watered, and the soil is good. Akeoo seems to be north and a little east from Yarkund, and the road is sometimes inhabited, sometimes not.

107. There remain some countries of which we have little information which can throw light on the present subject. Such are the Tibets and Kushkar. We know that they are ill cultivated, and perhaps the climate condemns great part of them to sterility. Other parts may be occupied by rocks and stones. From the particulars now detailed, it is evident that the countries most favoured by nature, are neither the upland tracts nor yet the open plains distant from hills, but those which lie at a moderate distance from their foot, and receive the water which flows from them. Lofty mountains however barren themselves, are the cause of fertility to the plains below. In the vast expanse here treated of, there is a very great proportion now uncultivated, and may continue so for ever. Some part is a loose sand or hard clay, unproductive without much water, which at the same time the climate and situation deny; another is covered with a profusion of stones. The composition of some lands seems adverse to the growth

of useful vegetables. The commonest species of this kind is saline land, which occurs at intervals in almost all the various districts which have been mentioned. A mere sand and a very hard clay seldom give evidence of this quality, which is thus found in soils otherwise of the best composition. Chhuchh, the lands of the Mundurs, and those of the Huzaras, are remarkably free from it. A certain degree of it is by no means inconsistent with fertility, nay, the natives of the west of Khoorasan, prefer land moderately saline for the raising of melons and cucumbers: some remarkable saline spots are mentioned under the subject, which next follows, (see paragraph 112.)

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## PART III.—OF NATURAL HISTORY.

### SECTION I.—Of Minerals.

108. The Persian metals are not found in these countries in great abundance. Most of the streams which rise in the great northern range, or in that branch of it which forms Kafirstan, and also those streams which arise in the Belur, wash down grains of gold which the natives take pains in collecting, but it is not supposed that this business is very profitable. In some parts of the south-east of the Huzara country, grains of gold are also found. With respect to silver, if we except a little found in the country of the Kafirs, it is produced no where but in the Chinese dominions, and I am not sure whether it be in their ancient territories or their new acquisition of Chinese Toorkistan. Copper seems to have been formerly found in the district called Seahbund (see paragraph 101) and according to some it is produced not far from Nishaboor, which is in the Persian Khoorasan. The same hill which yields it, is said to yield iron and lead; but according to others, lead is the only metal produced. Between Furah and Ghaeen, is Tubus, called *Miseen* from its copper mines, and to distinguish it from another Tubus, far to the west, commonly called Gil Tubus. At present both are under the Persians. Indications of copper are to be seen in the Bajour territory. In the kingdom of Bokhara, is a town called Sherabad, about seven days south-east of Bokhara, and about two days north of Sherabad is a hill called after it which produces copper, not wrought, and also verdigris, which is an oxyde of copper. With respect to precious stones, the ruby mines of Budukhshan, once so famous in the whole world are no longer wrought. We are told that in the south-eastern parts of that country

are whole rocks of *lapis lazuli*. Nishaboor is still famous for its turquoises, which are found in a hill in its neighbourhood, that yields no other mineral product. Major Welford has mentioned lapis lazuli, hyacinths, crystal, bajor, stones of a superior quality, and marbles of various colours, being found not far from the banks of the Indus, before its junction with the Cabul river, (see his paper on mount Caucasus in the sixth volume of the Asiatic Researches) I scarcely remember to have heard of these things, but as that author's information is generally very correct on points of geography and statistics, I presume there is much truth in the account.

109. Aboolfuzl has mentioned an iron mine at Khiroo in Kushmeer, and it is still wrought, being perhaps the only mineral of any note to be found in the valley. There are numerous mines of iron near Kanee Goorm of the Wuzerees, which lies to the north of the range of  $32\frac{1}{2}^{\circ}$ , towards its termination to the eastward. Iron is found near Burawul, and Burwa of the Turkoolnees, and also above Deer of the Yoosufzyes, lying in Punjkora. In all it is gathered in the state of coarse sand or gravel. An iron mine was formerly wrought near Dhukha of the upper Mihmunds. Near Cimnan, a city of Khoorasan, on the frontiers of Irak, iron is produced, and also in a hill four days south of Ghaeen. The existence of iron in the territory of Nishaboor is disputed; an ore of this metal is found in a hill of Chhuchh or Huzara, six miles west of Hussun Abdal. In Toorkistan there are very numerous mines of iron. In the territory of Kokum may be two, in that of Bokhara one, in that of Hisar two. Shuhursubz has one mine, the territory of Tashkund one, perhaps more. It is said Keerategin and Durwaz have none. In the territory of Fyzabad there are four mines; and in the small principality of Kolab, the greater part of which lies on this side the Oxus, between Keerategin and Fyzabad, there is one. Bulkh has one mine in its hill to the south, and Tolekan another. Notwithstanding the number of iron mines in Toorkistan, that metal is imported from Russia, and is of a superior quality.

110. Lead is very abundant in many parts of these countries. Not unfrequently it is found in the same matrix with soorma, which is an ore of antimony;\* sometimes it is found alone, as soorma also is. I have heard of the following mines of joint lead and soorma, viz. two in the country of the Afreedus, one at Khakshista of the Huzaras, south of Bameean, one or two near the source of the Urghundal, two

\* I am now (January 1811) assured there is also sold under the name of soorma a certain sulphate of lead, and it is natural to suppose, this is the substance here meant.

at least in Chitral, and one in the dominions of Kokur. One mine of lead is found in upper Bungush. In the country of the Shinwarees, who are west of the Afreedus, one mine. There are two mines in the country of the Kokurs, and one at Turbulakh of the Dehzungee Huzaras, who are the most westerly of all. Near Baghis of the Ty-munees within the Ymak hills, the spring torrents bring down pieces of this metal. I have not heard of its being found in any other place of Khoorasan, except near Nishaboor. In Toorkistan it is very abundant. There is one mine in the hills near Bulkh; in the principality of Talikan there seem to be two mines. In the district of Undurab there is one mine, and in that of Khoost another. Lead is also found in Khirjan, which lies between Khoollum and Bameean. In Budukhshan lead is abundant, and there are three or four mines in the valley of Wunj. Some lead is also brought through this country from Kashkar and the borders of the Kafirs. Kolab has two mines, Buljeewan, which is under the lesser Kolab and is beyond the Oxus, has one, and in the territory of Hisar are two. Nooruta has one mine, and there is perhaps another in the dominions of Kokun, and one or two in those of Tashkund. There is one mine in Keerategin, probably more. Soorma without lead is found in the principality of Talikan, in several places, and is said to be abundant in Budukhshan, Durwaz, and Keerategin. Soorma is found in the country of the Besoot Huzaras, who are among the most easterly of that nation. A mineral called white soorma, is found near Dubran, which lies north of Huzara.

111. Orpiment, which is yellow oxyde of arsenic, is found near Sakhir in Seahbund, and in more than one place in the hills of Bulkh. It is also produced somewhere in Budukhshan, near Lungreel, which is not far from Dubran; it is the ore of some metal of a whitish colour and a consistence which adapts it to be easily made into bullets. Towards Cabul and in many other places, the villagers use a certain species of gravel, called *sungisachma*, for shot. The most famous place for sulphur is Gogirduk, between Khoollum and Bulkh, but this mineral is said to be found in some other places of Bactria, to the east of Bulkh. Some is produced in the territory of the greater Kolab, and some in that of Fyzabad. Sulphur is reported to be found in the hill of Sherabad (see paragraph 188.) It abounds in Chitral, and some other parts of Kashkar, and some of it is in an oxydized state. Some is to be seen in the desert of Margiana (see paragraph 101.) There are two mines in Seeweestan, of which one is near Bhag, and one not far from Sunnee. The western Tubus is famous for its sulphur, as well as its tobacco. Some of the springs of the Kafirs

smell of sulphur. In these countries are many warm or even hot springs which could be named. The other natural curiosities known to the natives do not deserve much mention, especially as the circumstances of some seem fabulous.

112. The supply of common salt is from various sources ; rock salt, that of salt ponds, that of springs, and that made from the soil. A minor range of hills has been already distinguished as the Salt range, (see paragraph 12.) Some is found at the beginning of the range in the country of the Oorukzyes, but is of little note beyond the neighbourhood. At Kala Bagh, the hill which overhangs the town, is in a great part composed of salt. Near the termination of the range, this mineral again becomes very abundant, and is found in several places. This is that which in our provinces is called *Lahouree*, as coming to us through Lahour, though all produced beyond the Hydaspes. It is of a dingy colour, whereas that of Kala Bagh, which is superior, is either so white as to be pellucid, or tinged with a red colour from the clay contiguous to it. The north is supplied from these mines, whose produce is carried even into Kashkar, where it fetches a high price, because of the natural difficulties of transporting it. It is rather heavily taxed, in Kushmeer which makes it dear. When the governor rebels, which has often happened, and trade is checked by the existence of hostilities, the dearth is still greater, in so much, that the Kushmeerees having no interval supply, have been reduced to eat red ants as a substitute. In the south of the kingdom, the demand for rock salt is not great. Some is indeed carried from Kala Bagh, as far as the lowest parts of Sindh, but this traffic bears no proportion to the riches and population of that country, and indeed seems an appendage to that in the transporting of pilgrims, who intend visiting the holy city of Mecca. The boats are sold on their arrival with what cargo they may contain, and few if any again ascend the river as far as Kala Bagh. In all parts of Bulochistan, soil salt is that chiefly used, and each neighbourhood makes it for itself. Even the Moolta-nees consume more of this kind, pretending that the other is unwholesome. Candahar is partly supplied with salt from that made by boiling the water of a spring at Kushkinukhood, 40 miles on the road to Hirat, and partly from the soil ; the latter is reckoned inferior. The chief resource of the west or rather middle parts of Khorasan, is probably in salt ponds, in two different places of the country of Ghaeen. An ice-like crust is formed at the edges, when the water begins to recede in the dry season, and no further preparation is required. Besides the salt well in the Loot desert already mentioned, there is one about

40 miles south of Toorbut, and another in the road between Toon and Yezd, but none of these are of any use. Near Ubasabad, which is ten days from Mushhud, on the road to Tuhiran, is a hill which gives out two feeble salt springs, which make two bogs, and to procure salt pits are dug at the edges and filled with the brine; this gradually evaporates, and is covered with a saline crust.

It is probable, many lesser ponds and bogs of this nature exist especially in the level countries. Bokhara and Nooruta chiefly consume salt brought from places in the Kurakol (see paragraph 105.) Jizzukh has a mine of rock salt, and also salt from the plain. Samarkand is said to have one mine, Oratepa another. All the three are under Bokhara. Oorgung, Mura, and Mymuna chiefly use salt found in their own plains, sometimes artificially prepared, sometimes not. The kingdom of Kokur is not destitute of soil salt, but has besides at least four mines of rock salt. Tashkund has one, probably more, and also receives salt from the plains to the west towards the Kuzzaks. We know of two mines in Keerategin, one in Buljeewan, two in the greater Kolab, and the valley of Wakhan has rock salt, but the southern part of Budukhshan in which is situated Fyzabad, seems to have but one mine, and its produce is very bad. The eastern part of Bactria, on the other hand, is abundantly supplied, having at least five mines, and Duroona beyond the Oxus has one. One mine of Shuhisubz yields salt of a very fine quality, which is carried as far as Bulkh and Bokhara for the use of the rich. Hisar has a salt spring, and two mines very little worked exist in its dominion. Bulkh and Bokhara are partly supplied from springs found between them, partly from a place under the hills, where a crust of salt is produced. Shibirghan has a mine of very good quality, and exports to Bulkh, Undkho, and other places. I have not learnt that any salt is found within the Parapanisan mountains, and such is the scarcity of this article among the Huzaras of the interior, that they do not use it dry but dip their morsels in a brine of it. At one time of the year the poor have none to consume.

113. Saltpetre is no where found in these countries but is made by natives, from the soil in innumerable places. It is a curious fact that the same earth which yields common salt often yields saltpetre also, although both ingredients be different; but dry situations are more favorable to it, and moist to the generation of salt. To complete the list of ingredients used for making gunpowder, it may be observed that no place is much famed for its charcoal. The best is made from the willow, and very good from the plant called uk or mudar (see paragraph 130.)



Borax is dug up near Mushhud in an impure state. A salt called black salt is found in a hill some miles south-west of Kala Bagh. The most famous product of Kala Bagh is its alum, which however is not native, but is prepared from a mixture of pure clay and sulphur, found in the same hill which yields salt. The same exists in small quantities in the quarter where the Lahouree salt is produced.

114. I have made no mention of the minerals of the Tibets, or country north of the Punjab, or those of the Rajpoot country. We know little of the minerals of Chinese Toorkistan, except that coal is burnt at Ela, in that country; and some mistakes have probably been committed in assigning the situations of mines in independent Toorkistan. With respect to the structure and general composition of the hills and mountains, it is needless offering conjectures; the hills seen by us were plainly secondary. Soft and composite rocks appear to be very common in Afghanistan, and hence it is that in a country so mountainous, few houses are built of hewn stone. The valley of Kushmeer is peculiarly destitute of stones proper for building; wood at the same time is cheap and abundant, and therefore the inhabitants erect lofty houses of that material. Good flints are found in many places in the south-east of Bactria, (from whence they are brought to Cabul) in some low hills in the districts of Muro, in those west of Sindh, and doubtless many more. Upper Bungush produces a marble much esteemed.

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## SECTION II.—*Of Vegetables.*

115. The present is a subject on which little is known. What here follows being also very imperfect, it is needless to affect nice divisions, and it is enough if we distinguish plants into three classes; first, grasses and small succulent plants;—second, shrubs;—third, trees.

### *1st. Of Grasses, &c.*

116. It is moisture which chiefly encourages the growth of herbage. Those countries however are not the most verdant in which the greatest quantity of water falls in the year, but those in which there are many days of rain, dew, and mist. The water which falls in low latitudes, does so generally in a short space of time, and with great violence, so that drought prevails during the greater part of the year; hence warm countries are seldom verdant. We should be in error if we supposed that heat, as distinguished from drought, was

hostile to verdure. The season of grass in all countries begins with the renewal of the warm season, unless in circumstances the most peculiar; and even in warm countries the herbage withers at the beginning of winter. Neither are we to decide that warm countries have naturally more grass throughout the year than the cold; for if their summer be dry, the heat of the sun soon withers the pastures, which do not recover until next spring. It is evident therefore that the growth of herbage will be greatest where heat and moisture meet in due proportions. Moisture may arise from the atmosphere or from the soil; and with respect to the moisture of soils, it may arise either from the composition or a low position. It is thus that a clayey loam is better covered with grass than a loose sand or a hard clay; and many districts, the drought of whose climate would leave them little verdure, have abundant grass which is nourished by the water descending from higher situations. A new complexity is added to the subject when the periodical rains fall in the summer, and thus revive the grass which has been withered by the heat in the warm climates.

117. It is found that in India every grass and small plant has its natural seasons of putting forth its new leaves, flowering, casting its seed, and withering. Most of them flourish most in the Kureef, that is after the great rains have begun to fall. Very many however even of these put out new leaves in February and March—soon to be burnt up by the scorching winds; and some of them bear seeds in the Rubbee as well as the Khureef. Some plants naturally flourish in the Rubbee; for example, the Sehoon, or wild oat—the seeds of which are shed before the commencement of the great rains, but do not spring up until perhaps the month of October. From what has been said, it is plain that in India there are two seasons of grass—the lesser in spring, and the greater in the great rains, and for a short time after them. The winter months have but little fresh grass, but there is a considerable resource in the withered grass of the Khureef. Between the spring and Khureef grass is an interval in which the pastures are burnt up by the excessive heat and drought; if the soil be very moist, or frequent showers fall, this interval may not be perceptible. It may be supposed to be the same with every country which, like Hindoostan, has a warm climate, and its chief rains in the summer; but when either fails we no longer find these two natural seasons of herbage. When the cold reaches a certain point, the heat of summer is not sufficient to wither the grass after its commencement in the spring, and this is reserved for the cold of winter. The grains of the Rubbee, also, it may be observed, in climates where the winter reaches a certain degree of

length and severity, do not spring up in autumn, but in spring, and ripen in autumn. In warm countries which have no summer rains, the spring grass having once withered, does not recover during the remainder of the year.

118. In the Punjab and Sindh the seasons of grass are the same as in our provinces, and the species are much the same. In the upper Punjab there is perhaps more grass fit for provender than in our upper provinces, but the large kinds used for thatching are scarcer, this however is of little consequence, the inhabitants preferring flat-roofed houses covered with mud, to the thatch so common elsewhere. Hurriana and Bhutner are well known to have abundance of good grass; and the country in general which lies between the Sutluj and the Jumna is more verdant than that on this side of the latter river. The Doob of the Hydaspes and Indus present the usual varieties. Pothwar has but little grass, except in the bottoms of the ravines. The hilly country of the Gukhurs, and others already mentioned to the north, appear to have much grass, but this does not arise from the great growth but from the small consumption. In the Thul of Mohummud Khan, as in the great desert, we find more shrubs than grass. Mooltan, and upper and middle Sindh, have little grass. The spring of Peshawar is naturally later than in our provinces, and the rains which then fall have an additional tendency to protract the time of fresh grass. The lateness of the summer rains, and their comparative unimportance, makes the Khureef grass later in commencement, and causes it to be little superior to that of the spring grass in this country; it is even said that in Jellalabad the spring grass is of more importance than the Khureef. In Seeweestan though the summer rains are scanty, the Khureef grass is superior to the other kinds; but herbage is not abundant in that province. Peshawar, though its summer rains are deficient, has yet as much grass on an average of all months as our provinces, for showers fall at different times of the year, and the soil is good. The name of Shurhsuz which Tymoor gave it, we may suppose alluded rather to its constant succession of green crops, than the exuberance of its natural vegetation in grass, which is not extraordinary. The least quantity of grass is in the middle of winter and the middle of summer.

119. The seasons of grass in Chhuchh, Huzar, Kohat, Malgeen, Eesakhel, and Bunnoo, are nearly the same as in Peshawar, and the quantity not very different. Mukulwud has but little grass, but some parts of the Daman have a great quantity. The hills called Bedault, owe their name to the scantiness of their herbage. The hills of Bajour,

Punjkorā, Swad, Bhooner, and Pukhlee, afford abundance of grass in the summer; and the plain of Bajour is even more verdant than that of Peshawar. The grass of Koonur is inferior to that of Bajour, and that of Jellalabad to Koonur, but Lughman is superior to both. Kushmeer, and the hills which surround it, have a very abundant herbage in summer, but it is not reckoned nutritious; in the winter the sheep and other stock are house-fed—a management probably more judicious than if they were kept on the grass remaining under the snow, or were driven to a warmer climate.

120. A great part of the surface of the districts of Cabul and Ghuznee is covered with stones, and the soil is in other respects unfavorable to the growth of grass. The new leaf appears in April, and there are but few places, where it is affected by the summer heat, or withers until autumn. If the soil be moist and has been well covered by snow, the grass remains green even during the winter, but makes very little progress in the spring. It may be observed, that the grass of sandy soils appears earlier and also decays sooner than that of other soils. In the winter the sheep of these upper countries are driven to warmer climates to the eastward, and have been known to come as far as Husun Ubdal. It would be difficult to estimate whether the cold or the warm countries here have most grass during the year on a given surface. In the summer, that of the cold is most luxuriant, but in the winter there remains little beyond some withered herbage under the snow; whereas in that season the warm countries have a certain degree of verdure remaining, especially after a shower, and when the surface is free from snow. The nature of the soil too has an influence, and the upper countries are the less productive of grass, as much of their surface is covered with stones. Cabul is proverbial for a scarcity of fodder, but this does not arise from the nature of the soil, but from there being a great number of horses and other animals, and but little ground for pasturage left uncultivated.

121. Khoorasan has a dry climate, and no summer rains; hence its temperate and warm parts have very little herbage. Bulochistan has still less, and Seestan is ill supplied. Sheep and goats are seldom kept in the villages, but pasture during all seasons at a moderate distance from them. There are indeed certain parts, particularly in the Dooranee country, where the flocks return to the villages after the grass has been burnt up, and are subsisted on straw and other products of agriculture or gardening, with some assistance from the meadows which are not withered by the heat. A considerable part of the Dooranee flocks are driven in summer to the

country of the Ymaks, where they find plentiful pasturage. The Ymaks do not, on the other hand, resort in the winter to the country of the Dooranees, which has less herbage than their own, though warmer, but returning to their *kishlaks*, or winter residences in the vallies, subsist their flocks partly on what grass they can find in good weather, and partly on what has been cut for them in the autumn. The Huzaras, in a climate still more severe, reap great quantities of grass for their sheep, which are seldom unhoused during three months of winter, but sleep under the same roof with their master. Grass is very abundant during the summer in both countries. Bactria too, with the exception of the sandy spaces, is a verdant country and has many meadows, which are always green. In the plains the snow is seldom so deep as to prevent the cattle reaching the grass, but among the hills it is found prudent to provide in part for their provender by a stock of grass, cut in the autumn. The reaping of grass is very common in Kushmeer and in parts of Pukhlee, Bhooner, Swad, Punjkora, Cabul, and Ghuznee, but in general the sheep which have not gone to the low countries are driven out to feed on the shrubs and withered herbage of a hill exposed to the sun, which has been reserved for this purpose. Straw also composes a great part of their food.

122. With respect to Chinese Toorkistan, we have little information. Yarkund and the sandy tracts (see para. 106) have but little grass. Khootun is in this respect much superior, as in most others. As to independent Toorkistan beyond the Oxus, generally considered, it is not inferior to Bactria, but within it we are to distinguish—1st, the dry sandy plains—2nd, the moist plains and meadows—3rd the little and lower hills—4th, the high hills and elevated plains. The first has least grass; the new leaf which had been nourished by the snow is on the 20th March about three inches long; after three months it withers from the heat of the sun. The meadows have abundance of grass, which is continually renewed. Some banks of rivers have a close sweet turf, but the meadows in general afford a deep grass. The lower hills are better clothed with grass than the dry plains, but are not equal to the meadows; their grass has nearly the same periods as the former, and on a given surface perhaps supports during the year an equal number of animals. The hillocks, are, in the country beyond the Oxus, of sand, and bear a scanty grass, which soon withers. In Bactria and Muro the hillocks are of a good soil, and bear good grass. The high mountains and plains of Toorkistan have a grass which makes little progress in the spring, but grows luxuriantly in the summer, sometimes exceeding a man's stature, and it does not wither until autumn; the inhabitants

reap a portion of it for the sustenance of their stock during winter. In the west of Toorkistan this practice is but little known. In districts, such as that of Samarkand, which are well cultivated, the stock, which is not very numerous, is fed on straw or hay. Where natural pasture is near and plentiful, they are driven out to it even in the depth of winter; hence an extraordinary fall of snow causes a great mortality among them. It is still more fatal to the stock of the Kirghizes and Kuzzaks, who inhabit a more rigorous climate, and having little agriculture have less resource when the surface of the ground is covered with snow. They make no provisions of dry grass, in which we are not altogether to blame them as improvident, for some have scarcely a fixed residence for winter; and the flocks are so numerous, that it would be difficult to provide sufficient provender for all. Some of the Kirghizes frequent the Pamer, which bears a most luxuriant herbage, but by reason of the cold it is not pastured more than a third part of the year. On their return, they feed their flocks in the warmer vallies below, until the heavy falls of snow and severe cold force them to retire to their *kishlaks* in the vallies, near which they have left forage remaining for the wants of winter. The sheep remove the snow with their feet, or if too deep they follow the track of the horse, where he has uncovered the herbage. All the animals drink the snow in this season. It is thus the quantity of herbage and its natural seasons, determine the mode of life of a great part of the population.

123. Pasturage may be divided into two species, the shepherd remaining in one climate, or visiting another different from his own. In warm or temperate climates far removed from any other, he feeds his flocks all the year near his own village, and according to the distance, brings them back to the village by night, or not. In very cold climates when circumstances prevent an access to more temperate ones during the winter, they subsist in that season on reserved pasture, on the grass which has been reaped, or on the straw or other products of tillage. But when in the same neighbourhood there are warm plains and cold mountains or upland plains, nature lays the foundation of a more erratic life, the flocks being driven up in the summer and down in the winter. Sometimes there are constant inhabitants in both the upper and the lower countries. It is thus the Ghiljies, who stay in the elevated country of Cabul and Ghuznee, send part of their flocks in the winter to the various warm countries, from the most southern parts of Daman to Koonur and Jellalabad. In the summer the inhabitants of these countries send a part of their sheep to the upper country, but the proportion is not considerable. Sometimes the

habitations of the people are in the vallies and plains, and they frequent the hills and upper plains in the summer—this is the practice of Kushmeer, Pukhlee, Bhooner and Punjkora. Sometimes they reside in the high country—it is thus part of the Kafirs leave their high hills in the winter to pasture their goats among the low ones, and the declivities. The Afreedies too in general stay in the upper part of their country. During the summer the shepherd shelters himself under trees or rude sheds of grass; in the winter he removes to low hills, where he finds natural or artificial caves in the rocks to receive him and his flocks by night. Some of the Dooranees near the Helbund construct habitations for themselves from the branches of trees and mud. The Dooranees, in general, Ghiljies, and Beelochees live under black tents; the Ymaks, Huzaras, and nations of Toorkistan use *khirgas* made of felt and wood, or *kuppas* made of felt and reeds.

124. Some details might be given of the species of plants found in these countries, but they would be little interesting. A considerable number of spontaneous products form articles of food. The chief are the lotus, the ruwash, some of the fungins, a kind of wild vetches, a plant bearing some resemblance to the turnip, the roots of the tulip, the leaves of the plant in India called paluk,\* and the seeds of some of the gramina; other plants are used in medicine, and perhaps we have here something to learn of the natives. Perfumes are extracted from others, for instance from the grass which in India is called Gundhel or Mircheegundh, † and which according to some yielded the spikenard of the ancients. The well known dool‡ grass of India seems to extend over all these countries, some parts of which moreover have superior species. Two of these called Rishka§ and Shuften|| are also artificially raised. The Surkunda appears to extend to the utmost verge of our inquiries to the north-west, and it is not so much from the want of proper grasses as from other circumstances, that in the countries of the west a thatched house is scarcely to be found; a flat roof with a balcony, or a vaulted one without it, are substituted. This last expedient is resorted to wherever wood is dear. Of noxious vegetables, there is none worthy of mention except it be the Bhoart. This abounds in the country of Beekaneer and the neighbouring ones, as far as our military station of Lodhiana, the sandy parts of the great Indian desert, and in some quarters of the country between the Hydaspes and Indus. Its seed which is some-

\* A species of beet. † *Andropogon, nardus vahl.*

‡ *Panicum dactylon. Linn.* § *Sueerne.* || A kind of trefoil.

times gathered, and even sold at a considerable price, is covered with several sharp prickles, which readily attach themselves to clothes, and are with difficulty taken out. However insignificant they may seem, they are the chief annoyance to a traveller. Beyond the Indus, and a short distance from its banks, we do not find that grass which yields the khus\* so useful during the hot winds in India. In these countries tattees are not much used except in the hottest season, and then only by people of condition. The plant employed is the Juwasat† of India, in Peshawar called Jhoy, and by those who speak Persian Shooturkhar, from its being a common food of the camel; besides these uses, in some places it yields manna, for example, the neighbourhood of Candahar and Hirat, and the banks of the Chilchick (see paragraph 45.) This precious substance exudes from it after the spring rains are over, and is collected by merely shaking it off. It is also produced in Toorkistan, on the dark barked or cultivated willow, and from some other plants.

#### *2nd. Of Shrubs.*

125. These countries have shrubs and low trees of several varieties and in great abundance. It may be remarked that they are most abundant in unfertile and uncultivated places; whether it be that such is their peculiar situation, or that they occupy places refused by the herbs and succulent plants and by the timber trees I know not. Some insinuate their roots among rocks and loose stones; some grow on the hardest clays and merest sands, and in the driest climates; and others overspread the salty deserts. Though humble, they are however useful, and demand some of our attention.

126. Some furnish food from their roots, barks, flowers, or fruits. The last only is worth mentioning, and the most remarkable species is the barberry, which abounds in the east of Toorkistan, the Ymak country, the skirts of the great northern range, and some parts of that of 34°. It is little cultivated, but that which is raised in Ghaeen is much esteemed. The plant in India called Jhurbeereeat extends to the foot of the hills in the northern and western directions. The Byr, which is said to be merely a cultivated species of the barberry, is raised in Peshawar but not in Khoorasan or Toorkistan, where instead of it is cultivated the Connal, a fruit which much resembles it in taste and properties, and is found wild in the hill of Bajour, in Pukhlee, some parts of Persian Khoorasan, and probably many other quarters. On the low hills in the east of Afghanistan, and those south of Kushmeer, which yield

\* *Andropogon muricatum*. Linn.

† *Hedysarum Alhaji*. Linn.



berries; such are the goorgoor, moomanee, kookee, simloo, gurinda (the Kurounda\* of Hindoostan) and some others. By the banks of streams there is found a plant which bears a fruit intermediate between the raspberry and bramble. The wild grape is found both in the warm and cool climates, but disappears in very cold ones; its fruit is sour, but is sometimes eaten either fresh or fermented. In the countries of the west, sugar being dear, various substitutes are found for it, for example, preparations of dates and other fruits, and a preparation of the sugar melon and honey; but perhaps the most common is what is called Doshab, which is sometimes made of apples or mulberries, but oftener of grapes, wild or cultivated, the juice of which is boiled to a consistence.

127. Where grasses are plentiful, as in Cabul and the cultivated parts of Khoorasan and Toorkistan, a spirit is extracted from them. In the Punjab and Sindh coarse sugar is the chief material from which spirits are extracted, but the inhabitants of the latter sometimes use the date alone, or mixed with sugar, and in the Punjab the same use is made of a fruit called Umlok, which is both wild and cultivated.

In some villages of Cabul a strong drink is extracted from mulberries, and in Kushmeer from pears. In Keerategin, and other parts of Toorkistan, there is a coarse grape called Muska, this they gather, boil, and afterwards dry in the sun. A water melon is now opened at one end, and about nine of these grapes are inserted and forced into the substance of the water melon, which being done, the orifice is shut up by re-applying the piece which had been cut out. In seven or eight days it is found that both substances have fermented, and the pulp of the water melon is converted into an intoxicating liquid fit for home use. But in Toorkistan the favorite liquors are Koomiz, made from mares' milk, and Boza, made from rice; these liquors are both wines, not spirits; they are somewhat acid, and are reckoned wholesome. Koomiz is not considered as coming under the prohibition of the law of Mahomet; but in most of the principalities, especially where the Tajiks bear sway, Boza is strictly forbidden. Although these prohibitions, whether serious or not, are quite ineffectual when they are met by a disposition to elude them, both Koomiz and Boza are less consumed in the great towns than among the pasturing tribes; yet on the whole there is less intoxication among the latter, for the people of towns indulge themselves in opium, the wine of the grape, and

\* *Carissa Carandas*. Linn.

various preparations of hemp. Not only in these countries but in most others, intoxication is commonest in cities and crowded neighbourhoods; whether it be that company invites conviviality, and conviviality leads to excess, or that the real and imaginary ills of life being more oppressive where population is accumulated, the miserable are driven to this resource to procure a temporary relief in forgetfulness; a review of these countries will furnish no arguments for the common opinion, that climate influences this part of the character. The force of example is much less doubtful, and the colonies of Persians settled in the Afghan dominions still retain the love of wine for which their ancestors were noted.

128. Very many wild shrubs and wild trees furnish materials for dyeing, but the natives seem to have no secrets in this art. The cultivated dyes are chiefly indigo, turmeric, bastard saffron,\* and madder. Indigo is unknown in the countries of the west, which are supplied from Mooltan and the neighbouring countries. Turmeric† is raised in Peshawur and many other places on the east side of the hills, but Bunno and Beer, a district of Pukhlee, are the most famous for it. It is not raised in the cold countries, or in the west. Bastard saffron, a more valuable product, is not raised in very warm situations, and indeed seems confined to Kushmeer and Ghaeen. The plant in India called Al‡ is found wild in Bajour and many other places on the east side of the hills, but is not used as a dye, though valued for its cathartic quality. The madder plant does not seem adapted for warm climates, yet some is cultivated in Gunduwah. It is raised at Kilat and Mungoochur, in Bulochistan, and some parts of Toorkistan, but its chief seats are Zumundour, and the country from Cabul to near Candahar. What comes to India chiefly passes through Candahar and Shikarpoor. Logwood, or rather sapan§ wood, grows on the mountains of Kushmeer, but whatever conjectures may be formed, I have found no evidence of its existence beyond the Indus until we reach Mazunduran. Toorkistan is supplied with it and kermes from Russia.

129. For tanning and colouring leather the bark of the almond, the leaves of the Kushnar|| tree, a shrub called Barik, and many others are used. In all cases a lye of lime and alkalies is required. Leather is ill prepared in Afghanistan, and the people of the hills are fond of

\* *Carthamus tinctorius*. Linn.

‡ *Morinda cihifolia*. Linn.

† *Curcuma longa*. Linn.

§ *Caexilpina sappan*. Linn.

|| *Bauhinia* sp.

wearing shoes of undressed leather. Still simpler are those called Chuplee, woven from the leaves of a plant which the Afghans call Muzir, and the Peshawurees, Putha ; it grows to the height of a man, but in general is under that height. It is not found in the cold countries, but extends to a certain height on the east side of the hills, beyond which is Khoorasan and Toorkistan. To the south it is found in some parts of Seeweestan, and to the east it is not known beyond the longitude of Husan Abdal. It is of the palm kind, and perhaps is yet undescribed. It bears a small fruit, which ripens in July. An Afghan will make a pair of chuplees in a single hour during a halt ; they are tied on the feet like sandals. The Kushmeerees make sandals of rice straw.

130. The Assafœtida\* plant is produced in great abundance towards the source of the Ghorbund river, and also near Isfizar (which is three days from Furah), and some other places in the west of Khoorasan. It prefers a cool climate, and the only cultivation bestowed on it is to shield it from the sun. Assafœtida is more consumed in India than in the countries of its production, where however it is used in food and also medicinally. Many other shrubs furnish articles for the native materia medica. Blisters are made with the leaves of Kureel, a plant well known in India and also in Peshawur. The plant called Ak† or Uk, has a white corrosive juice, which the Rajpoots give to their infant daughters as a poison, when they do not intend to bring them up. This plant yields charcoal, and is good in tanning, dyeing, and pharmacy. The sacred Toolsee‡ is found in all these countries among shrubs famous for the beauty of their flowers, but the most remarkable is that called by the natives Urghuwan, or Anemone shrub. It grows in some parts of Cabul, Budukhshan, and Durwaz. In Durwaz it grows to the height of twenty feet ; spears are made of its wood, and it is a common fuel.

131. Shrubs are the chief fuel in these countries, generally considered, though there are some districts where more use is made of forest timber or the branches of large trees, and others in which the chief resource is the dung of animals. Caravans sometimes find a difficulty in procuring fuel at uninhabited stages, but few towns can be mentioned where this article is dearer than in our provinces. It is dear in Candahar and Cabul ; and in the latter a great quantity being required, it forms an important part of the expenditure of the poor.

\* *Ferula Assafœtida.* † *Asclepias gigantea.* Linn.

‡ *Ocimum sanctum.* Linn.

The rich Cabulees chiefly burn the wood of four trees—the mulberry, mastich, oak, and bulhuk, a tree so called in Cabul, and by the Persians *kurghuna*. The poor content themselves with a fuel of shrubs or dung, and the dung of horses is eagerly carried away from the streets. The pasturing tribes bring the dung of sheep for sale, which in the city is used as fuel, but in the villages as manure for grapes. The capital was a good deal distressed in the winter of 1801, when the Ghiljies of the neighbourhood interrupted the usual supplies of fuel.

132. In the Indian desert there is abundance of the plant which, after the Arabians, we call Kali, and the same is found in some other quarters. By the Persians it is called Ishkar, but I apprehend this name is given to some other alkaline plants, particularly to that known to the Hindoostanees under the name of Lance, and which is plentifully found in the Indian desert, and also in the wastes of Khoorasan, Bulochistan, and Toorkistan. In these quarters are at least two other plants of an alkaline nature; the pasturing tribes wash by means of the leaves and flowers of these plants. The Lance is thus used in Jellalabad. A common practice is to burn them and use their ashes. Near the Indian desert great use is made of the ashes of Kali, and many in Toorkistan and Khoorasan use those of the Lance. By the addition of fat a true soap is formed, and this is preferred by the more civilized part of the population. The soap of Hindoostan is superior to that of all those countries, but Toorkistan and Bokhara are noted for this manufacture. In Kushmeer and Bajour meal of the Oord is substituted for an alkali, but in all cases a proportion of lime is added.

### *3rd. Of Trees.*

133. The trees best known in India, for example—bamboo, mangoe, tamarind, neem, bukaen, seesum, sal, the banyan tree, peepul, firs, peeloo, kudum, lusora, bēl, jamun, khinnee, kuchnar, umlats, tota, semur, pakur, moursuree, senjhna, jand, dhak, babool, kyr, burhur, kuthur, aoonla, gondee, kumrukh, toon—are quite unknown in Cabul or the countries beyond it, and very few of them are to be seen in Kushmeer or Peshawur. The bamboo is not known beyond Khanpoor of the Gukhurs, nor is it found in any part of Sindh, or even of the Sooba of Ajmeer. The mangoe is cultivated in Sindh, but Tymoor Shah unsuccessfully attempted to introduce it at Peshawur. The mangoe is cultivated at Keech, in Bulochistan. The plantain does not bear fruit beyond the 33rd degree of latitude; it is unknown in the cold countries, and does not extend far into Bulochis-

tan. The tamarind and neem become rarer as we leave our provinces, and are unknown in Peshawur, as are the kudum, bēl, khinee, tota, moursuree, jand, kyr, burhur, kuthur, kumrukh, dhak, and some others. In Jellalabad are lost, in addition to those, the seesum, banyan tree, peepul, lusora, jamun, kuchnar, umlats, semur, senjhna, babool, peeloo, aoonla, and some others. The date tree reaches Jellalabad, but extends no further in this parallel. In the south it extends through Bulochistan into Perna; and in Bulochistan it is very abundant, and a main support of the population. In Kilat however it is not found by reason of the cold, nor is it seen in Toorkistan or in any part of the north of Khoorasan.

134. In India gum is extracted chiefly from various species of the genus *mimosa*, which includes the kyr, babool, jand, and chhokur, of which the last only reaches Peshawur, but there is a species of *mimosa*, bearing a great resemblance to the first, but not found in our provinces. It is very common on all the low hills between the Hydaspes and Indus, and is called Pholoo, and yields gum, which besides being useful in medicine is sometimes eaten. It does not grow in the cold climates. It has been used with great advantage as a hedge round a fort. In Cabul and the countries of the west where none of this genus are found, gum is extracted from the cultivated trees of orchards, the jujube tree, the wild almond shrubs, and the mastich. In Toorkistan the gum mastich is used for fixing colours in the dyeing of chintz. These are not the only trees from which gum is extracted both towards India and in the west. The jujube is not seen east of the Indus, perhaps is not seen east of the valley of Cabul, but there, and in the west, it exists both wild and cultivated. The mastich is not very abundant on this side the Indus, but beyond that river it is found on most of the hills, except the warmest, and it bears the cold of the Huzara mountains. To the west it extends to Persia, and in a northern direction it crosses the Jaxartes. It is seldom found far from hills.

135. There is a certain plant in Toorkistan, and elsewhere, which is called Seehuk, and its roots yield a coarse resin. The pine species yield the best, and tar is also extracted from them. In remote situations it is more common to rive the tree with wedges than to saw it into planks. Pines are not found in all situations even of the cool countries, but prefer the steep sides of hills, never being found indigenous to plains or tame featured hills. There are some now growing at Herat planted by the late Nooa Moohummud Babunee. They are plentifully found on the sides of the great northern range, and the Bebur;

(with their various branches of a steep character and moderate height,) in the middle of the range of  $34^{\circ}$ , in nearly the whole of that of  $32\frac{1}{2}^{\circ}$ , in the beginning of the salt range, on the mountain called Tuchtī-Sooliman, on the lofty mountain Bunseekurn, and the Jadran range, on the Ootman Khel hills, on the Aktan hills in Toorkistan, and some of the mountains of Chinese Toorkistan. Pines are also found in some spots of the Kokur country; Cabul is supplied from the mountain of Kulkucha, about three days to the east. Bameean, Ghuznee, the Huzara and Ymak countries have no pine trees. Some are found in a few spots of Bulochistan. The natives distinguish at least seven kinds, but all are not found in the same quarters. Toorkistan and Kushmeer do not seem to possess that species which is called Julghoza, and which bears a large cone, the seeds of which are idly supposed to possess many good qualities. Another species by the Afghans called Shouty, is remarkable for its being so combustible that the natives use it as a torch; this too seems unknown in Toorkistan. I have received no hint of the larch or any other deciduous species of the pine being found in any of those countries. It may be observed, that the fall of the leaf does not take place even in the same species at one time in climates so different. In Peshawur most trees retain their leaves till near spring, but in Cabul, Khoorasan, and Toorkistan the autumn frosts shed the foliage.

136. Evergreens, besides the pines, are but few. It may be conjectured holly grows on the lofty mountains, but I have never received any hint of it. The cypress is chiefly known as a cultivated tree, but is found wild in some situations. Excepting it, the natives reckon the chinár or sycamore, the most beautiful of trees. Some are found at Lahour, but are certainly not indigenous. There are two species, the Chinár or Sufeda, which has a broad shade, and the Punja-chinár or Sufedar, which grows slender and tall. The Chinár is indigenous in Kushmeer, Khost of Bunnoo, Goorzwan in the Ymak country, Durwaz, and various other situations. It prefers a moderate climate inclining to cold, deep valleys, and a moist, fat soil.

137. The same situations are most favourable to willows, but some of them are seen growing in all climates, from the plain of Peshawur to the country of the Huzaras. This is perhaps the only tree which withstands the cold of the Pamer. The willow is banished only from the hot and dry plains, and some peculiar situations. There are several species, but four are the most known, viz.—the weeping willow, which the natives call Mujnoon, and value for its beauty, the Bedi Mooskk from which is extracted a perfumed water, the green willow which is the commonest of all, and the red, which grows straight and

tall. The two last are used in building, chiefly for rafters of houses, and insects do not eat their timber. All the four species are cultivated, though some more than others. In Kushmeer and some other places the twigs of willows are given to cattle. In none of these countries are osier baskets made.

138. It is probable that the high mountains have some English trees which we cannot identify from the descriptions of the natives. The birch is plentiful in Kushmeer, and also many places of the Belur mountains, yet its bark is imported from Russia into Bokhara, where it is used to stuff saddles—an article there manufactured of good quality. The only species of oak is that known in systems by the name *Quereus Bilote*, which does not become a great tree. It is not found in Khorasan, or Toorkistan, or in the warmer countries towards India; the Cabulees call it Buloot. I know not what are the trees called Seah, Chob, Bulhuk, Pudda, and Gurung.

139. The mulberry grows wild over a vast expanse of country, yet is rarely seen in the plains. It grows in the vallies of all but the warmest hills. Its fruit is much improved by cultivation, and it has varied into at least twelve varieties, all of them good. There is a difference in their ripening, but the mulberry harvest generally speaking coincides with that of wheat and barley in the same climate. In various parts of Toorkistan the mulberry is very important to the natives, furnishing a fruit, a doshab, and when preserved a considerable article of food. Now here is it so important as in Punjsher, where the natives grind it into flour, and this forms the chief food of the country. The mulberry plantations are so extensive that they are not walled in, and some individuals are said to possess ten thousand trees, but this seems an exaggeration. A very good tree will bear ten maunds of mulberries, and if the average produce be one-third of this, it is calculated to support a far greater population than tillage. The produce is little affected by the seasons and is remarkably equable.

Silk is not made except in certain quarters. Kushmeer raises enough for its own scanty consumption, but Peshawur and other countries of the east are supplied from abroad, chiefly from Goojrat, and our provinces. To the west the first place which produces silk is Gundumuk, in a temperate climate between Cabul and Jellalabad, but there is none in Cabul or Ghuznee; considerable quantities are raised in the Afghan Khorasan, but less than in the Persian part of the province and in Toorkistan. Great quantities are raised in Khoonun.

140. The pistachio tree is confined to Toorkistan and that side of the Paraparnisan which lies towards it, but it is little cultivated. The wild

almond shrub (which when cultivated attains a great size) is very common in many places, but its fruit is not eatable. An oil esteemed in medicine is extracted from the stones both of this and the cultivated sort. The oil of walnuts is so cheap in Kushmeer, that it is more used in food than any other oil or fat. The tree requires a colder climate than the mastich, but like it is found in the very cold ones. Where it is naturally very abundant, it is not cultivated. A good tree in perfection will bear, it is said, forty thousand walnuts in a season, and two thousand in Cabul fetch a rupee when cheap. The wood is good for some purposes, by reason of its strength and hardness. The natives are not accustomed to use olive oil in their food, but apply it to medicinal purposes: this plant grows on most of the low hills. Though it is not found in Cabul, Toorkistan, or Khoorasan, it is plentiful in some places between the Euxine and Caspian.

141. Nearly all the species of fruits cultivated in these countries are also found natural in some parts of them, chiefly in the vallies of cool and cold mountains. These are the apple, pear, cherry, plum, apricot, peach, quince, and pomegranate. The fig, though found in most of these climates seems yet to prefer the warm. The *naring*, a species of wild orange, grow on the hills south west of Kushmeer.

142. Of these countries Kushmeer has probably the greatest variety of indigenous species, and is at the same time as well wooded as any. It may be remarked that the same situations are generally well wooded which have been already described as favourable to the pine (see paragraph 135), the steep sides of hills being favourable to its growth, whether it be that forest trees love shelter, or because they are here best secured from animals. The low hills are not so woody as the high, being more affected by shrubs and low trees of little use as timber, than by forest trees. On the whole these countries are but ill wooded, though superior to Persia. Toorkistan, excluding the deserts of the west, is on the whole superior to Afghanistan, and the northern part of that country to the southern Bulochistan has very little wood. The plains of these countries have naturally but few trees and (contrary to what takes place in most countries of Europe) they become better wooded with the progress of cultivation. Few of the natives plant for timber, but a good deal is yielded from the numerous orchards of the countries of the west, which have been planted for fruit.

(To be continued.)